Hello, I'm Colby August

A roboticist with a background in electrical and mechanical engineering

Personal Statement:

I am a current graduate student at Rensselaer Polytechnic Institute **pursuing my M.S. in electrical engineering with a focus on robotics and machine learning based controls**. Having an unquenchable thirst for learning, I have decided to continue my education planning on pursuing my PhD in robotics starting in 2026.

My interests include biorobotic systems where I look to for inspiration by incorporating elements of both physical design and institute control to develop innovative and optimized solutions. **As roboticists we breathe life into our work through the design and programming process** so what is not a better place to start than taking keys from biological systems which have already had millions of years of real world experimentation.

My commitment to continuous learning has **driven my success in R&D roles that demand a high level of hands-on experience**. I excel in experimental problem-solving and thrive in environments that require iterative learning through experimentation. Below are some examples of previous project I have undertaken.

Technical Expertise:

Throughout my academic and industry career, I have gained extensive experience with various **CAD platforms**, including NX, SolidWorks, and Fusion 360. Additionally, I have worked with **virtual simulation tools for FEA and CFD**, such as NASTRAN, SimSolid, Altair Inspire, HyperMesh, and FlightStream. My expertise extends to **programming for controls and data analysis** using MATLAB, C++, and ROS2, as well as **machine learning frameworks** like PyTorch, Scikit-Learn, and TensorFlow.

Prepositive Monitoring and Control of Spanwise Morphing Wing to Control the Aerodynamic Center Enabling Improved Dynamic Flight Performance:

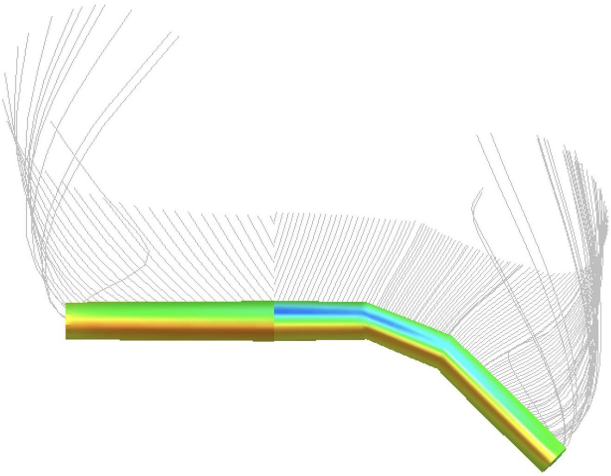
Rendering of Morphing Wing Internals & Actuation System

Methods & Outcomes:

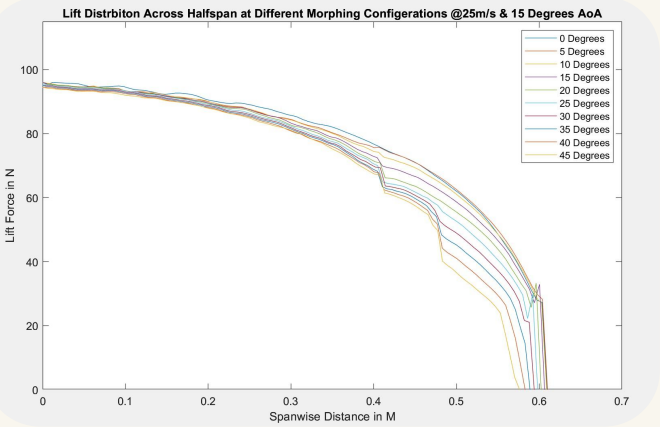
- Wing half span test platform is 24” in length with a root chord of 8.25” and a tip chord of 6.25” with a NACA 0018 airfoil selected for the wing profile due to its zero lift properties and constant chordwise aerodynamic center location found at the quart chord
- Morphing system features an out of plane morphing design inspired by wingtip deflection of gliding seabirds utilizing a lightweight shape alloy actuation unit with two articulation points allowing for adjustments in wingtip anhedral angle with 45° range of motion
- Rigid wing section comprised of carbon fiber skinned foam core uses strain gauges placed along the top and bottom quarter chord location are to determine changes in wing loading in real time
- Preliminary simulated results highlight changes in lift distribution caused by morphing shifting the center of pressure inward along the wing within a 1.5” range
- A model-free end-to-end deep reinforcement learning algorithm is used to determine current wing morphing profile based off center of pressure location using proprioceptive feedback from strain gauge network as well as control the spanwise location of the aerodynamic center via active morphing

Project Description:

Research into the effects of wing morphing for gull birds when in glide reveal active morphing is utilized to change their aerodynamic center improving stability in both glide and dynamic flight configurations. The goal of this research project has been to develop a system for monitoring changes in the center of pressure based off wing morphing and in turn use active morphing to control the spanwise location of the wing’s aerodynamic center.



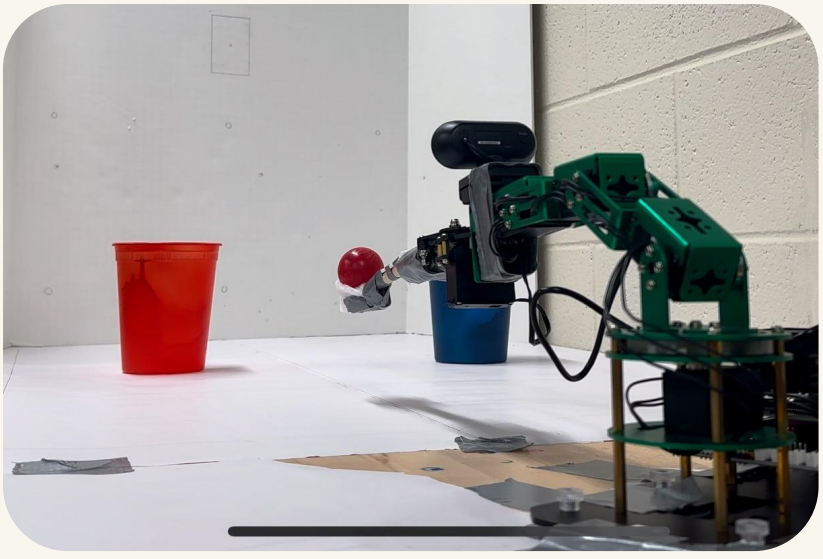
CFD Comparison of Rigid & Morphed Wingtips (above)
Changes in Lift Distribution Due to Morphing (below)



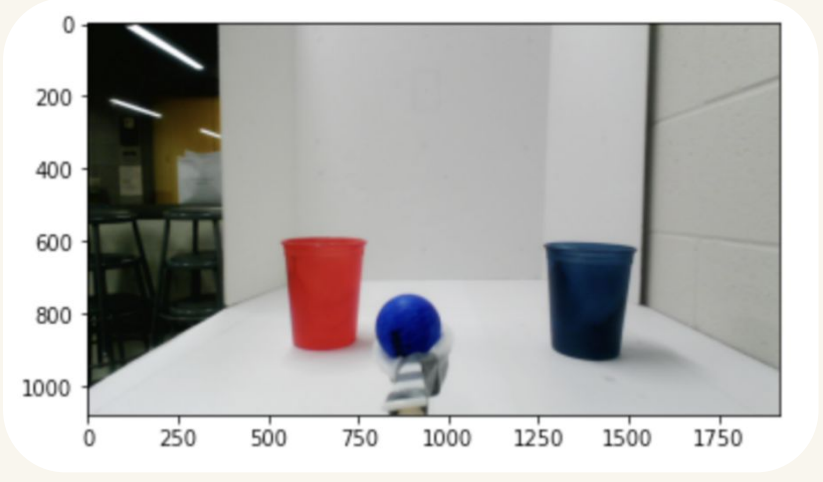
Skills Learned:

Model-Free Controls via Deep Reinforcement Learning, Sensor Calibration, Composite Layup, CFD Analysis, Shape Memory Alloy Actuation, Soft Robotics Design

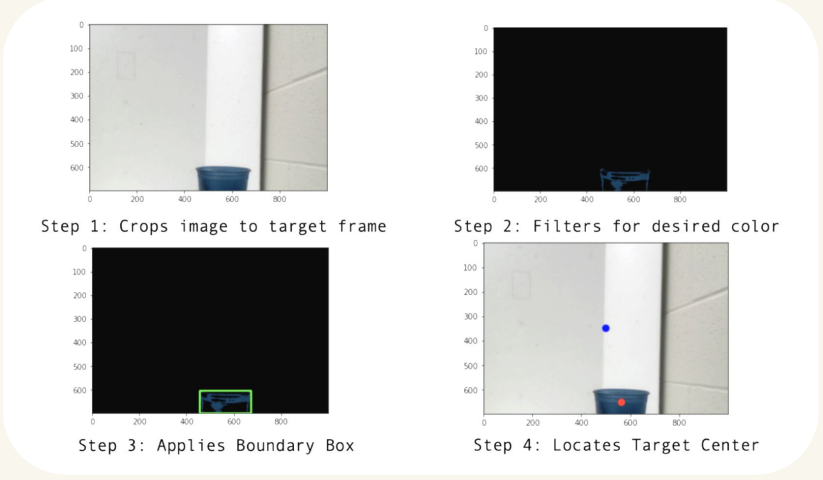
Control of 6DOF Manipulator via Computer Vision for Object Recognition and Target Placement:



Full Setup of Manipulator Holding Object w/ Targets in Range



Manipulator End Effector View Before Performing Target Alignment


Step 1: Crops image to target frame
Step 2: Filters for desired color
Step 3: Applies Boundary Box
Step 4: Locates Target Center

Step-By-Step of Image Filtering for Object Detection & Application of Boundary Box

Project Description:

To improve the pick and place capabilities of a 6DOF manipulator computer vision techniques were used for object/target detection, determining distance from the manipulate base to the target, and align with the desired target with image based visual servoing allowing the manipulator to place objects outside its physical reach through a throwing motion.

Methods & Outcomes:

- The objects in question were colored ping pong balls which color was classified based off the average RBG value of a cropped image of the end effector
- Moving into two preset configurations images were taken of the targets and utilize stereo vision techniques a depth map and converted to distances from manipulator base to the targets using the known camera parameters
- Color filtering was applied to the camera scene allowing for the desired target to be identified and located in space with a boundary box
- Image based visual servoing was used to align the target and manipulator
- The manipulator would adjust its speed when performing the throwing motion based off the measured target distance allowing it to hit the desired target anywhere within the manipulators throwing range
- Out of 20 test cases with different colored objects given in a random order the program was able to correctly identify and locate the target in space with 100% accuracy and successful land the object in the target 70% of the time

Skills Learned:

Computer Vision, ROS2, Stereo Vision Depth Perception, Image Based Visual Servoing, Servo Characterization

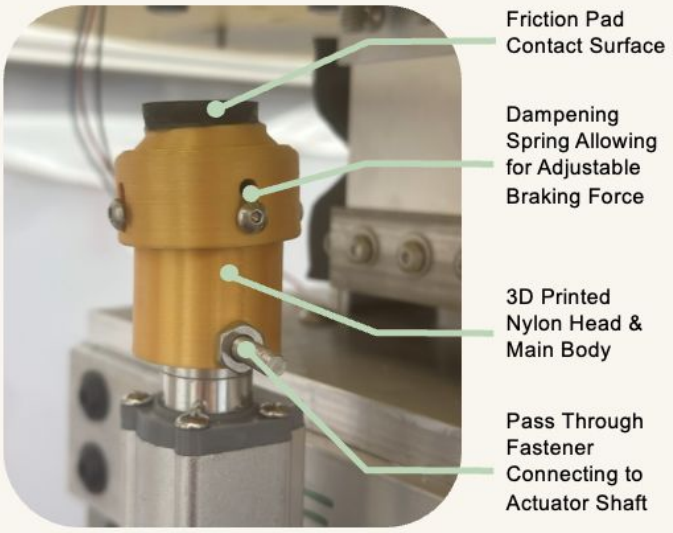
Development & Implementation of Multi Functional Emergency Braking System for High Speed Gyroscopically Stable Test Stand:

Project Description:

For the testing of a high speed gyroscopically stable test stand for determining the damping characteristics of a passive electrodynamic suspension system for a novel magnetically levitating E-VTOL motoring system a low-speed stability and emergency braking system was needed to protect the test equipment.

Methods & Outcomes:

- Utilizing three linear actuators, the system could apply upwards of 300N of stopping force with 0.01” precision and 25 millisecond response time
- Dampening units were incorporated into the actuator heads using metal springs and friction pads to improve control over the amount of and rate of force being applied
- PID control was incorporated using position feedback to synch the movement of the three linear actuators ensuring that they would all meet the rotating target at the same time
- Control lockout was incorporated into the user interface to ensure the system could not accidently be triggered and cause damage to the test apparatus


Friction Pad Contact Surface
Dampening Spring Allowing for Adjustable Braking Force
3D Printed Nylon Head & Main Body
Pass Through Fastener Connecting to Actuator Shaft

Breakdown of Dampening Unit Design

Skills Learned:

Circuit Design, Soldering, PID Feedback Control, Microcontroller Programming, Mechanical Design, CAM Programing & CNC Operation

Wiring Schematic of Full System Featuring Motor Driver Unit (left), Actuation Unit (right upper), and Control Unit w/ User Interface (right lower)